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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
WANG, TED M	
ART UNIT	**PAPER NUMBER**
2634	

DATE MAILED: 12/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/686,784	PEETERS, MIGUEL PHILIPE PAUL
	Examiner	Art Unit
	Ted M. Wang	2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed on 9/27/2005, entered by RCE dated10/25/2005, with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claim 1-3, 5, 10-12, 14, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al. (US 6,654,431) in view of Yeap et al. (US 6,456,657).

- In regard claim 1, Barton et al. discloses a multimode digital modem for demodulating a multi-tone, multi-band signal using an inverse discrete Fourier transform or inverse fast Fourier transform (Fig.3 element 340) to generate a signal having plurality of tones spaced in frequency in a plurality of frequency bands (Fig.3), comprising

  a plurality of demodulators, wherein each of the plurality of demodulators demodulates one of the plurality of frequency band of the multi-tone, multi-band signal (Fig.10 element 460 and column 13 lines 33 –column 15 line 26), and

wherein each demodulator includes a discrete Fourier transform module that performs a discrete Fourier transform on the plurality of tones within one of the plurality of frequency band (Fig.10 elements 430 and 431 and column 13 lines 33 –column 15 line 26); and

wherein the plurality of demodulators perform demodulation in parallel (Fig.10 elements 451-452, 460, and 461-462, and column 14 line 59 – column 15 line 15). In Bartons' reference, Fig.10, the K x demodulator 460 receive the chosen symbol set of K symbols from diversity selector 450 and perform the obverse functions of modulator 320 of FIG. 3. Demodulation is effected by a table look-up procedure wherein the real and imaginary coordinates of each complex symbol is located in the table and the code associated with each such complex symbol is outputted from demodulator 460 as a parallel stream of bits on K paths 461, . . . , 462. It is inherent that the K x demodulator perform the demodulation in parallel.

Barton et al. discloses all of subject matter as described in the above paragraph except for specifically teaching wherein each of the plurality of demodulators utilizes a different sampling rate.

However, Yeap et al. teaches a receiver comprises a plurality of demodulators (Fig.6 elements 62, 63, 66, 68, and column 9 lines 10-38), wherein each of the plurality of demodulators demodulates a different one of the plurality of frequency bands signal utilizing a different sampling rate (Fig.6 elements 62,

63, 66, 68, and column 9 lines 10-38, Fig.4A and 4B, and column 7 line 34 – column 8 line 40).

At the corresponding decoder 13' shown in FIG. 6 of Yeaps' reference, the signal S'_o received at port 30 is supplied to each of three bandpass filters 61_o, 61_1 and 61_2 which recover the modulated carrier signals y''_o, y''_1 and y''_2. The recovered modulated carrier signals y''_0, y''_1 and y''_2 are demodulated using multi-carrier double sideband (DSB) demodulator 62. A carrier generator 63 generates carrier signals having frequencies f_0, f_1 and f_2, which are supplied to multipliers 64_0, 64_1 and 64_2 within the demodulator 62 and which multiply the carrier signals f_0, f_1 and f_2 by the recovered modulated carrier signals y''_0, y''_1 and y''_2, respectively. The DSB demodulator 62 comprises low pass filters 65_o, 65_1 and 65_2 for filtering the outputs of the multipliers 64_0, 64_1 and 64_2, respectively, as is usual in a DSB demodulator.

The demodulated signals from the filters 65_o, 65_1 and 65_2 are decimated by 2M, 2M and M, respectively, by decimators 66_o, 66_1 and 66_2 of a decimator unit 66 and the resulting recovered sub-band signals y^*_0, y^*_1 and y^*_2 each supplied to a corresponding one of four inputs of a synthesis filter bank 67 which applies to them an Inverse Discrete Wavelet Transform (IDWT) as illustrated in FIG. 4B to recover the signal S'_i which corresponds to the input signal S_i. The high pass sub-band wavelet signal y_3, which was not transmitted, is replaced by a "zero" signal at the corresponding "highest" frequency input 68 of the synthesis filter bank 67.

In addition, if the sub-band wavelet signal y_1 that was not transmitted, is will also be replaced by a "zero" signal at the corresponding "band pass" frequency input y^*_1 of the synthesis filter bank 67. Thus, each plurality of demodulators (62, 66, 67) demodulates a different one of the plurality of frequency bands signal utilizing a different sampling rate.

It is desirable to have a receiver comprising a plurality of demodulators, wherein each of the plurality of demodulators utilizes a different sampling rate in order to reduce the risk of corruption resulting from part of the signal being lost or corrupted during transmission and/or storage (column 3 lines 15-18) so that the communication quality is improved. Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by Yeap et al. in which, a receiver comprising a plurality of demodulators, wherein each of the plurality of demodulators utilizes a different sampling rate, into Bartons' demodulation circuit so as to reduce the risk of corruption resulting from part of the signal being lost or corrupted during transmission and/or storage so that the communication quality is improved.

- In regard claim 2, all limitation is contained in claim 1. The explanation of all the limitation is already addressed in the above paragraph.
- In regard claim 3, Barton et al. further discloses that each demodulator further includes an equalizer connected to the output of the discrete Fourier transform in Fig.10 elements 440 and 441 and column 14 lines 42-58.

- In regard claim 5, Barton et al. further discloses that a transceiver including a receiver according to claim 1 in Fig. 3 and 10.
- In regard claim 10, Barton et al. further discloses that the multi-band signal is generated by filtering the output of the modulator (Fig.3 element 380).
- In regard claim 11, which is a method claim related to claim 1. All limitation is contained in claim 1. The explanation of all the limitation is already addressed in the above paragraph.
- In regard claim 12, which is a method claim related to claim 3. All limitation is contained in claims 3. The explanation of all the limitation is already addressed in the above paragraph.
- In regard claim 14, which is a method claim related to claim 5. All limitation is contained in claims 5. The explanation of all the limitation is already addressed in the above paragraph.
- In regard claim 17, which is a method claim related to claim 10. All limitation is contained in claims 10. The explanation of all the limitation is already addressed in the above paragraph.

4. Claims 4 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al. (US 6,654,431) and Yeap et al. (US 6,456,657) as applied above to claim 1, and further in view of Allpress et al. (US 6,496,546).

- In regard claim 4, Barton et al. and Yeap et al. disclose all subject matter as described in the above paragraph except for specifically teaching that wherein

each demodulator further includes a filter for filtering the received signal prior to the discrete Fourier transform.

However, Allpress et al. teaches wherein each demodulator further includes a filter for filtering the received signal prior to the discrete Fourier transform (Fig.6A element FIR filter and FILTER 1– FILTER N).

It is desirable that wherein each demodulator further includes a filter for filtering the received signal prior to the discrete Fourier transform in order to improve the noise and design complexity so that the communication quality is improved and system cost is reduced. Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by Allpress et al. in which, wherein each demodulator further includes a filter for filtering the received signal prior to the discrete Fourier transform, into Barton et al. and Yeaps' receiver so as to improve the noise and design complexity so that the communication quality is improved and system cost is reduced.

- In regard claim 13, which is a method claim related to claim 4. All limitation is contained in claims 4. The explanation of all the limitation is already addressed in the above paragraph.

5. Claim 6-8, and 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al. (US 6,654,431) and Yeap et al. (US 6,456,657) as applied above to claim 5, and further in view of Ho et al. (US 5,317,596).

- In regard claim 6, Barton et al. and Yeap et al. disclose all subject matter as described in the above paragraph except for specifically teaching that each demodulator includes an echo canceller for removing an echo associated with a signal in a transmitter of the transceiver from the received signal.

  However, Ho et al. teaches that each demodulator includes an echo canceller for removing an echo associated with a signal in a transmitter of the transceiver from the received signal (Fig.3 element 100 and column 5 line 26 – column 6 line 25).

  It is desirable that each demodulator includes an echo canceller for removing an echo associated with a signal in a transmitter of the transceiver from the received signal in order to cancel the interference (column 5 line 26 – column 6 line 25) so that the communication quality is improved. Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by Ho et al. in which, each demodulator includes an echo canceller for removing an echo associated with a signal in a transmitter of the transceiver from the received signal, into Barton et al. and Yeaps' receiver so as to cancel the interference so that the communication quality is improved.

- In regard claim 7, Barton et al. and Yeap et al. disclose all subject matter as described in the above paragraph except for specifically teaching that echo canceller is connected to remove the echo at the input to the discrete Fourier transform.

However, Ho et al. teaches that the echo canceller is connected to remove the echo at the input to the discrete Fourier transform (Fig.3 elements 100 and 56 and column 5 line 26 – column 6 line 25).

It is desirable that echo canceller is connected to remove the echo at the input to the discrete Fourier transform in order to provide an improved echo canceller that accurately estimates and eliminates unwanted echo present in full-duplex data communication channels (column 4 lines 3-6) so that the communication quality is improved. Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by Ho et al. in which, echo canceller is connected to remove the echo at the input to the discrete Fourier transform, into Barton et al. and Yeaps' demodulation circuit so as to eliminates unwanted echo present in full-duplex data communication channels so that the communication quality is improved.

- In regard claim 8, Barton et al. and Yeap et al. disclose all subject matter as described in the above paragraph except for specifically teaching that each echo canceller comprises an adaptive filter.

However, Ho et al. teaches that each echo canceller comprises an adaptive filter (column 6 line 50 – column 7 line 4).

It is desirable that each echo canceller comprises an adaptive filter in order to improve the echo cancellation performance (column 7 lines 1-4) so that the communication quality is improved. Therefore, It would have been obvious to

one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by Ho et al. in which, each echo canceller comprises an adaptive filter, into Barton et al. and Yeaps' demodulation circuit so as to improve the echo cancellation performance so that the communication quality is improved.

- In regard claim 15, which is a method claim related to claim 6. All limitation is contained in claims 6. The explanation of all the limitation is already addressed in the above paragraph.

6. Claims 9 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al. (US 6,654,431) and Yeap et al. (US 6,456,657) as applied above to claims 1 and further in view of Agee (US 6,128,276).

- In regard claims 9 and 16, Barton et al. and Yeap et al. disclose all subject matter as described in the above paragraph except for specifically teaching that the signal is generated by nulling selected tones in the modulator.

  However, Agee teaches that the signal is generated by nulling selected tones in the modulator (column 6 line 5-17 and column 9 lines 49-59).

  It is desirable that that the signal is generated by nulling selected tones in the modulator to eliminate out-of-cell interference (column 5 lines 1-14). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by Agee in which, the signal is generated by nulling selected tones in the modulator, into

Barton et al. and Yeaps' modulator circuit so as to eliminate out-of-cell interference.

7. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al. (US 6,654,431) and Yeap et al. (US 6,185,202) as applied above to claims 1, and further in view of Liu et al. (US 6,442,195).

- In regard claim 18, Barton et al. and Yeap et al. disclose all subject matter as described in the above paragraph except for specifically teaching that the receiver comprises a splitter wherein the splitter communicates each of the plurality of data signals to one of the plurality of demodulators.

  However, Liu et al. teaches the receiver comprises a splitter (Fig.2 element 210 and column 6 lines 32-50), wherein the splitter communicates each of the plurality of data signals to one of the plurality of demodulators (Fig.2 element 295, column 6 line 51 – column 7 line 5, and Fig.3 and column 7 line 55 – column 8 line 4).

  It is desirable that the receiver comprises a splitter wherein the splitter communicates each of the plurality of data signals to one of the plurality of demodulators in order to improve the frequency band selecting ability so that the communication quality is improved. Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by Liu et al. in which, that the receiver comprises a splitter wherein the splitter communicates each of the plurality of data signals to one of the plurality of demodulators, into Bartons et al. and Yeaps' demodulation circuit

so as to improve the frequency band selecting ability so that the communication quality is improved.

8. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al. (US 6,654,431) and Yeap et al. (US 6,185,202) as applied above to claims 1, and further in view of Kahre (US 5,680,388).

- In regard claim 19, Barton et al. and Yeap et al. disclose all subject matter as described in the above paragraph except for specifically teaching that the discrete Fourier transform module performs a discrete Fourier transform at sampling frequency (Fs, k) wherein the sampling frequency (Fs, k) is associated with the frequency band of the demodulator.

  However, Kahre teaches that the discrete Fourier transform module performs a discrete Fourier transform (Fig.2 element S) at sampling frequency (Fs, k) wherein the sampling frequency (Fs, k) is associated with the frequency band of the demodulator (Fig.2 element U, and column 4 lines 23-40).

  It is desirable that the discrete Fourier transform module performs a discrete Fourier transform at sampling frequency (Fs, k) wherein the sampling frequency (Fs, k) is associated with the frequency band of the demodulator in order to improve the synchronization (column 4 lines 23-40). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by Kahre in which the discrete Fourier transform module performs a discrete Fourier transform at sampling frequency (Fs, k) wherein the sampling frequency (Fs, k) is associated with the

frequency band of the demodulator, into Barton et al. and Yeaps' receiver so as to improve the synchronization.

- In regard claim 20, all limitation is contained in claims 19. The explanation of all the limitation is already addressed in the above paragraph.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ted M. Wang whose telephone number is 571-272-3053. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ted M Wang
Examiner
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